

Remarks/Arguments:

Claims 1-3 and 5-10 are pending and stand rejected. In this response, Applicants are amending claim 6 and adding new independent claims 11 and 12. Accordingly, claims 1-3 and 5-12 are now presented for reconsideration. No new matter has been added.

Applicants' invention is drawn to a hermetic compressor having grooves provided at an upper side and a lower side of the outer circumference of a piston. The outer shape of the grooves communicates with a space in the hermetic container at least when the piston is in the bottom dead center position.

Claim Rejections Under 35 U.S.C. §112

Claims 6 and 9-10 are rejected under 35 U.S.C. §112, second paragraph, as being indefinite. In this response, claim 6 has been amended to recite "... said first and second groove portions having a contiguous semicircular shape... ." Claims 9 and 10 depend from claim 6. Applicants respectfully request withdrawal of the 35 U.S.C. §112 rejection.

Claim Rejections Under 35 U.S.C. §103

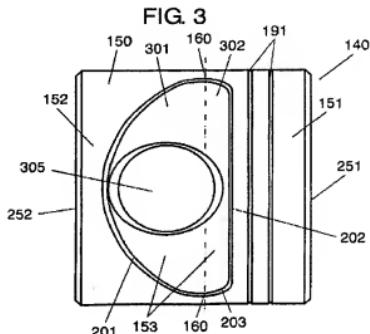
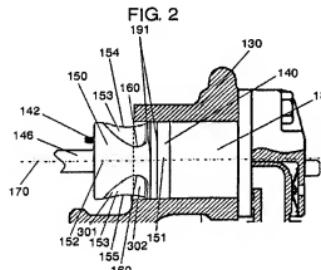
Claims 1-3 and 6-10 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Japanese Patent Publication No. 2003-065236 (hereinafter "Katayama") in view of U.S. Patent No. 5,076,226 (hereinafter "Watanabe"). Claim 5 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Katayama in view of Watanabe and further in view of U.S. Patent No. 5,092,747 (hereinafter "Irino"). Applicants respectfully submit, however, that the claims are patentable over the art of record for at least the reasons set forth below.

Applicants' invention as recited by claim 1, includes features which are neither disclosed nor suggested by the art of record, namely:

... the outer shape of the grooves is a contiguous semicircular shape extending toward a skirt side of the piston, and the semicircular shape includes a first outer shape extending toward the skirt side of the piston, a second outer shape parallel to the top surface of the piston, and

a third outer shape linking the first outer shape and the second outer shape, and a curvature of the first outer shape is smaller than that of the third outer shape ...

(Emphasis Added). These features are found in Applicants' specification, for example, at page 11, line 7-page 12, line 10 and in Figs. 2 and 3 reproduced below. No new matter has been added.



As described in claim 1, the present invention relates to a hermetic compressor. The hermetic compressor has grooves 153 in a contiguous semicircular shape placed at the outer circumference of the piston 140. This contiguous semicircular shape includes a first outer shape 201 extending towards the skirt side 152 of a piston 140, a second outer shape 202 parallel to the top surface of the piston and a third outer shape 203 linking the first outer shape 201 and the second outer shape 202.

The Official Action relies on Katayama as disclosing:

... grooves (23e) are provided at an upper side and a lower side of the outer circumference of the piston, and of an outer shape of grooves, the outer shape of the grooves communicating with a space in the hermetic container at least when the piston is in a bottom dead center is a shape not forming a parallel line to an axial center of the piston when the grooves are developed in a plane, ... wherein a through-hole is disposed at about the center of the grooves

(Official Action, page 3, lines 14-22). The Official Action readily admits, however, that Katayama fail to disclose the following details of the grooves as taught by Watanabe:

The outer shape of the grooves (28 and 32; figure 2, 4, 9) is a contiguous semicircular shape ... extending toward a skirt side of the piston, and the semicircular shape includes a first outer shape extending toward the skirt side of the piston, a second outer shape parallel to the top surface of the piston, and a third outer shape linking the first outer shape and the second outer shape, and a curvature of the first outer shape is smaller than that of the third outer shape... .

(Official Action, page 4, lines 1-9). The Official Action asserts that Katayama in view of Watanabe as applied to claim 1 discloses the claimed invention.

The Official Action, on page 4, lines 1-14, argues that grooves 28 and 32 shown in Watanabe Figs. 2, 4 and 9 are equivalent to the Applicants' claim language. Applicant's respectfully disagree. Watanabe Figs. 2, 4 and 9, are reproduced below.

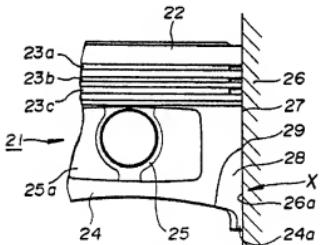


FIG. 2

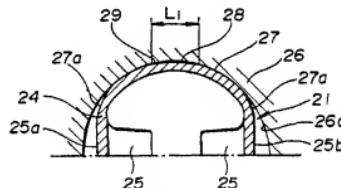


FIG. 4

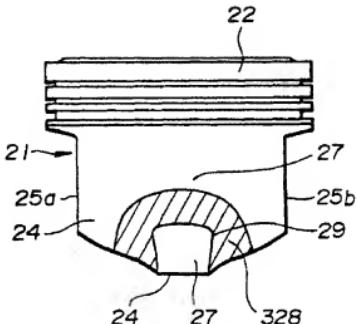


FIG. 9

As shown in Watanabe Figs. 2, 4 and 9, grooves 28 and 328 are not the same as the grooves described in Applicants' claim 1. Namely, grooves 28 and 328 do not include "... a first outer shape extending toward the skirt side of a piston, wherein the outer shape of the grooves is a semicircular shape extending toward the skirt side of the piston, and the semicircular shape includes a first outer shape extending toward the skirt side of the piston, a second outer shape parallel to the top surface of the piston, and a third outer shape linking the first outer shape and the second outer shape... ." Grooves 28 and 328 of Watanabe do not show a second outer shape parallel to the top surface of the piston. Likewise grooves 28 and 328 do not show a third outer shape linking the first outer shape and the second outer shape.

This is different than Applicants' claimed invention because Applicants' invention as claimed in claim 1 and shown above in Figs. 2 and 3 disclose a hermetic compressor, with grooves on the upper side and lower side of the piston wherein the shape of the grooves is a contiguous semicircular shape including a first outer shape extending toward the skirt side of the piston, a second outer shape parallel to the top surface of the piston, and a third outer shape linking the first outer shape and the second outer shape, and a curvature of the first outer shape is smaller than that of the third outer shape.

It is **because** Applicants include the features of the outer shape of the grooves being a contiguous semicircular shape extending toward a skirt side of the piston and the semicircular shape includes a first outer shape extending toward the skirt side of the piston, a second outer shape parallel to the top surface of the piston and a third outer shape linking the first outer shape and the second outer shape that the following advantages are achieved. This design allows sufficient oil supply to the groove to improve lubricity as described in the specification at page 11, line 7 to page 12, line 10, and the refrigeration capacity of the hermetic compressor is increased. Further, these features prevent local wear as described in the specification at page 12, lines 11-15.

Accordingly, for at least the reasons set forth above, claim 1 is patentable over the art of record. Applicants respectfully request, therefore, the withdrawal of the 35 U.S.C. §103(a) rejection and allowance of claim 1.

Independent claim 6, while not identical to claim 1, includes features similar to claim 1. Accordingly, claim 6 is also patentable for at least the reasons set forth above with respect to claim 1.

Claims 2-3 and 7-10 include all of the features of claims 1 and 6 from which they depend. Thus, claims 2-3 and 7-10 are also patentable over the art of record for at least the reasons set forth above.

Claim 5 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Katayama in view of Watanabe and further in view of Irino. Irino discloses a fluid compressing apparatus and is relied upon in the Official Action as disclosing the use of hydrocarbon refrigerants in a refrigerant compressor.

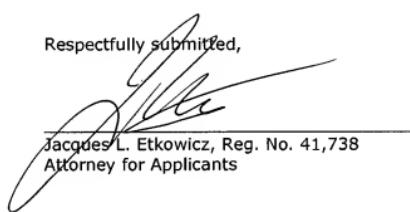
Claim 5 includes all of the features of claim 1 from which it depends. Irino, however, fails to disclose a piston with grooves wherein the outer shape of the grooves is in a contiguous semicircular shape extending toward a skirt side of the piston, and the semicircular shape includes a first outer shape extending toward the skirt side of the piston, a second outer shape parallel to the top surface of the piston, and a third outer shape linking the first outer shape and the second outer shape. Therefore, Irino fails to make up for the deficiencies of Katayama and Watanabe. Accordingly, claim 5 is also patentable over the art of record for at least the reasons set forth above.

New Claims

Newly added independent claims 11 and 12, while not identical to claim 1, include features similar to claim 1. Accordingly, new claims 11 and 12 are also patentable for at least the reasons set forth above, with respect to claim 1.

In view of the amendments and arguments set forth above, the above-identified application is in condition for allowance which action is respectfully requested.

Respectfully submitted,



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